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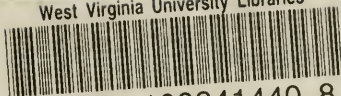
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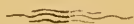
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Agricultural Experiment Station

MORGANTOWN, W. VA.



ADDRESS AND NOTES ON

SHEEP.

(By A. D. HOPKINS.)



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AN ADDRESS ON PROFITABLE LINES OF SHEEP HUSBANDRY FOR WEST VIRGINIA.

DELIVERED AT FARMER'S INSTITUTES IN KINGWOOD, LAUREL POINT,
MOUNDSVILLE AND WELLSBURG,

BY A. D. HOPKINS.

Mr. President and Members of the Institute:

On this occasion I shall not address you as Entomologist of the Station, but as a sheep breeder and wool grower I shall mention some conclusions from my personal experience and observations regarding the sheep industry of this State, and will indicate certain lines of the business which, in my opinion, offers the largest profits to the average sheep owners in different sections.

Within the last three years, I have had occasion as a member of the Station Staff to visit or pass through nearly every county in the State. Although my duties were mainly to observe the conditions in regard to insect depredations, my interests in the development of the sheep industry of our State and my experience of some twenty years in the breeding and care of sheep, in connection with other farm products, led me to observe closely the agricultural conditions of each county and sections visited. In comparing the conditions found with those observed in noted sheep growing regions in Kentucky, Ohio and Pennsylvania, which I had previously visited, and with those recently observed in grazing sections of Wales, England, France, Germany and Switzerland, my impression regarding the possibilities offered in West Virginia, in certain lines of sheep husbandry, are most flattering.

Hancock, Brooke, Ohio, Marshall, Wetzel and Tyler counties form a section of the State where fine wool sheep have been kept on most farms as one of the leading features for many years. The fertile lands, elegant blue grass sods; the flocks of the best type of fine-wooled sheep; and the quantity and quality of the wool produced, together with the prosperity and influence of those who have given special attention to this line of sheep husbandry, are evidences that this section is especially adapted to sheep, and are examples of the beneficial results to be gained from the general practice of keeping them.

Harrison, Lewis, Upshur and Gilmer counties form another section, where the same results have been gained from the breeding and feeding of Southdown and Shropshires, and other middle and long-wooled sheep and their grades for market lambs and mutton. Portions of Mason, Greenbrier, Monroe, Berkeley and Roane counties, and certain other sections of the state are equally noted for their blue grass pastures and profitable flocks of sheep, and are further examples of the profits and beneficial results the industry yields in different sections of the state. In fact, we find in our Mountain State all of the natural requirements necessary for profitable sheep husbandry in the line which will best supply the demands of our accessible markets. In the sections mentioned above, the majority of the owners of the land have appreciated and utilized these requirements to good advantage. The owners, however, of a large portion of the cleared land of the State have failed to do so, and we find widely differing conditions resulting from following, and the failure to follow, lines of farming, and methods of management, best suited to the requirements and environments.

I have invariably found that the land in sections of the State, where live stock, and especially sheep, have been kept as the leading feature since the land was cleared, has improved rather than diminished in fertility and that the people as a rule are prosperous and influential. On the other hand, I have found, with few exceptions, that where a system of plowing and growing grain has been followed, the land has become poorer each year, and the owners are anything but prosperous. I can truthfully say that I have seen hundreds of farms in different sections of the State which were naturally as good as those in the fertile regions mentioned, but through persistent cropping and bad management, they had become not only unprofitable but an expense to the owners. Such farms, I am grieved to say, are only too frequently met with. The well kept fertile ones often found adjoining them, proving that this condition is not the fault of the soil, but the fault of the owners and their methods of farming.

That a system of plowing and cropping the hills and mountains of our State does not, and never will pay, we certainly have evidence in the existing conditions resulting from the practice. That a system of grazing, and the judicious breeding and management of sheep on the same land, will reclaim the exhausted soil and improve the new, at a large profit to the owners, we also have proof in the poorest farms which have been reclaimed in this way, and in the fertile regions mentioned.

We admit that there are small sections in different parts of this State where the conditions are favorable for the profitable growing and marketing of grain, hay, tobacco, etc. There are many farms along the Ohio river between Wheeling and Huntington, and near cities and large towns in other portions of the State, on which the growing of large and small fruits, and general market gardening, will be found most profitable. With these few exceptions, however, it is my conviction that the remainder of the State is better adapted to a system of grazing, to

sheep husbandry, the dairy, and to the growing of large fruits, than to any other lines of agriculture.

In consideration of the above facts, and the possibilities offered in certain lines of sheep husbandry adapted to the conditions found, I am confident that, as our people appreciate more fully these possibilities, and as those in other States who desire to change their flocks to new and better localities, realize the opportunities offered, our sheep industry will make rapid progress, and in time take the lead for producing certain desirable qualities of both wool and mutton. All that is required, in my opinion, to bring about the above results, is that intelligent, progressive farmers should realize the possibilities of sheep husbandry in West Virginia as a money making business. We have intelligent farmers, and we believe that they will realize this requirement; in fact, many are already discovering that there are opportunities on the farms of our mountain State, equal to the average opportunities in the new or western states, or in towns, or large cities, where so many of our young men of push and energy have gone, not always to succeed.

PROFITS OF SHEEP HUSBANDRY IN WEST VIRGINIA.

That sheep under the present management, yield a larger profit than any other product on the average West Virginia farm, we have evidence in the answers to the following questions sent to correspondents in different sections of the State: "Do you consider sheep as profitable as any other farm product, if not, what is more profitable?" Ninety-one answered that sheep paid the largest profit, while three answered in favor of the dairy, one in favor of cattle, and one in favor of cattle and sheep combined. Speaking from my own experience of ten years on a farm in Jackson county, and eight years on a widely differing farm in Wood county, I can say positively that sheep paid me a larger profit on the money invested than any other product; the proof being found in a system of farm accounts and records kept with the different crops and live stock during the time mentioned. The account with sheep during eighteen years shows a profit of 50 per cent. on \$3,006 invested in the sheep, and 55 per cent. on \$996.20 cost of feed, pasture and attention; a total of 105 per cent. on the investment. The account with cattle of all kinds during the same time only shows a profit of 5 per cent. on \$8,100 invested, and no profit on \$4,050 cost of feed, pasture and attention. The account with wheat for four years on the Wood county farm shows a profit of only \$1.77 on the four crops, and as the wheat was sold, about one-eighth of its value must be charged to it for fertilizer ingredients removed from the soil; therefore, there was a decided loss when it was marketed.

From the results, as shown by these accounts, and the accounts kept with other farm products, I arrived at the following conclusions:

1st. The largest profit in money, and the greatest benefit to the farm was derived from sheep.

2nd. The least profit and the greatest loss to the farm was in the growing of wheat for market.

3rd. Cows and poultry paid a profit on the investment, and their value to the farm is a considerable item.

4th. Large and small fruits paid large profits on time and money expended.

5th. The growing of some corn and oats, and all of the hay necessary for the stock, the purchase of corn, corn fodder, bran, linseed and cotton seed meal to supply the deficiency in the feed grown, paid a handsome profit on the cost.

6th. That a system of farm accounts and records, have been of inestimable value to me in showing conclusively which lines of agriculture, and methods of farm management paid the largest profit on the time and money expended.

The fact that the keeping of sheep has been a profitable occupation in all civilized countries from the earliest records up to the present time, is evidence that the business will continue to be profitable in the future. Food and clothing are among the principal requirements of the people of a nation, and as sheep furnish the best material to supply both of these requirements, there will always be an active demand for certain qualities of wool and mutton, and the largest profits will be realized by those who can best supply them.

The question of how to best supply the demands of the present and future, is one of vital importance to the sheep industry of our State. Upon the proper consideration of this question depends to a great extent its prosperous development.

There is a demand for all grades of wool, from the finest Saxony and Silesian to the coarsest article used in the manufacture of carpets and rugs. There is also a demand for the different grades of mutton from the cheapest article to the best. These demands are best supplied by the growers who are situated in the countries, or regions, where the conditions are most favorable for the production of each at the largest profit on the investment. Thus, England is producing different grades of mutton at a profit on some of the best and highest priced grazing land. In Australia, and certain of our western states, sheep are kept in the largest flocks possible, on extensive ranges of the cheapest land, where wool as the only object is grown at a profit. Therefore, the conditions found in different sections of each country, state or county, together with the prevailing demands in the accessible market, must necessarily be taken into consideration, in order that the owners of sheep in each may best supply certain demands, at the largest profit to themselves.

In consideration of the above facts, I have been led to study the demands of our most accessible markets, and the conditions found in different sections of the State, with a view of ascertaining the kinds of sheep and methods of management most likely to yield the largest profits and best results.

We find in the eastern markets a demand for every grade of wool and for many different qualities of mutton, and a rapidly increasing demand for better qualities of the latter. We find in our home markets a demand in the cities and towns for more home grown mutton, and throughout the State an increasing demand for better grades of stock

sheep and breeding ewes, and for more thoroughbred rams of the mutton breeds with which to improve the stock. Which of these demands can best be supplied by the individual grower, each must judge for himself, but the fact is evident that the sheep industry of our State can no longer compete with the West, and with other countries, in the growing of certain grades of wool produced by inferior mutton sheep. It is equally evident that we can compete with any section of the country in the growing of first class mutton, in connection with the wool the best mutton breeds produce.

At one time in the history of the sheep industry of the eastern states, it paid better to kill the sheep and convert the fat into tallow, than it did to sell them to the butcher. Wool was then the primary consideration. The value of sheep for mutton was not taken into account. At the present time, in certain sections, and even on high-priced land, it is found that sheep kept for mutton alone will pay better than any other kind of farm stock. It is a demonstrated fact that it cost the eastern farmer less to produce a pound of mutton than it does to produce a pound of beef or pork; hence sheep will pay as well, if not better, than cattle or hogs, even if the wool only pays for the shearing. Therefore, taking everything into consideration, I believe for West Virginia, situated as it is within a day or twenty-four hours by rail from Pittsburgh, Washington, Baltimore, Philadelphia or New York, that the growing and feeding of sheep for mutton as a primary object and leading feature of the farm, is a line especially adapted to the conditions and requirements found, and that the largest profits will be realized by those who give this branch of the industry special attention and judicious management.

In concluding that the growing of sheep for mutton as a primary object, offers better inducements and greater possibilities to the owners of sheep in our State, I do not mean that every one should make a business of fattening sheep for the market, but I do hope to impress my hearers who breed thoroughbreds, raise stock sheep, market lambs, or fat sheep, with the importance of keeping in view, the final result of a first class article which will command the highest price in the market.

I am informed by a prominent butcher of Brooklyn that the demand for mutton in the large cities is increasing very rapidly, and that the laboring class, as well as the wealthy, are learning to like mutton, and while the laboring and poor class are more particular about the price than they are of the quality, the best hotels and restaurants, and thousands of private families, who care more for quality than the price, are demanding more mutton and lamb of choice quality, and are paying fabulous prices for the best.

While in Kentucky in 1880, a prominent sheep and cattle breeder of Bourbon county told me that he had shipped a number of choice Southdown wethers to New York, the previous Christmas, by special order of a first class restaurant, and that the net cash price for each sheep returned to him was \$15. I know of others in Virginia who get from 15 to 18 cents per pound for choice early lambs, and I also know parties who sold their lambs (from common ewes and Southdown rams) in one of our home markets last spring for five dollars each.

In glancing over the sheep market as far back as I have any record, I find something like this in all of the quotations: "choice to extra, scarce and in good demand. Fair to common, plenty, in poor demand, dull." As this has been the condition of the supply and demand of our markets in the past, it is not likely that there will be any trouble in the future about a sufficient supply of "fair to good," and, "common to fair." These grades come in competition with the common to inferior western dressed mutton, and western sheep, which will likely keep the price low enough for such grades to satisfy those who must economize in their purchases. "The choice to extra prime," and above are the qualities of which the supply is rarely if ever equal to the demand, and are qualities, the price of which in our eastern markets are not likely to be affected by competition with the wholesale cheap products of the west.

No state in the east offers better condition for supplying this demand for choice mutton at a large profit to the grower, than West Virginia. To produce the best quality and finest flavored mutton, a hilly, well-watered, well-shaded country in which the cultivated and native grasses, and a variety of wild forage plants flourish, is indispensable. This we have in every county in the state. Then, again, in order to transport the fat sheep and lambs to the cities already mentioned, place the mutton on the table of the epicure, and have it retain the requisite qualities of the first-class article, a reasonably short time must elapse between the time it leaves the farm and reaches the consumer, which may be easily accomplished by the accessible railroads passing through and penetrating different sections of the State.

Methods Adapted to Different Conditions: Taking our sheep industry as a whole, the breeding, rearing and feeding of sheep necessarily includes a variety of methods adapted to the different conditions found. We find valleys, mountain and forest ranges, on all of which both rich land and poor pastures are found. We find sections convenient to shipping facilities while others are quite distant from them. Different sections, therefore, require different methods. One section is better suited to the breeding and feeding of the large mutton breeds, or to the purchasing of stock sheep to feed and fatten for the butcher. Other sections will be found specially adapted to the rearing of market lambs.

In others, and especially in the highlands and forest ranges, and on poor hilly farms, the rearing of stock sheep; wethers to sell to the feeders and ewes to sell to those who are making a specialty of rearing market lambs, will be found most profitable for all concerned. There are other sections, especially in the Pan Handle counties, where the growing of fine wool, as a primary object will be found profitable, and the breeding of stud flocks of merinoes to supply a demand in the western states for choice eastern bred rams, will be found advisable and profitable for those who have already established a reputation and a trade in this line. Nowhere in the world can a better quality of Saxony and Delaine wool be produced than in Hancock, Brooke, Ohio and Marshall counties. It has been proven that the merinoes are especially adapted to that section, and owners of merino sheep there, who have been successful with them, should be very cautious about discarding their favorites for the mutton

breeds, for, in many cases, unsatisfactory and disastrous results will follow an abrupt change from one branch of the industry to another. For those who, after due consideration of the matter, find it advisable to make the change, it should be done gradually and preferably by crossing rams of the mutton breeds on grade merino ewes, than to change abruptly to the mutton breeds.

Each of the above methods is adapted at certain conditions and requirements found in different parts of the State, but there is one branch of the industry which will be found adapted to all; that is, the breeding of thoroughbred rams of the different mutton breeds with which to improve the common native sheep.

The use of thoroughbred male of the mutton breeds best suited to the improvement of our native stock in the hues desired is, in fact, of the greatest importance. Our success in producing the best qualities of mutton and lamb depends more on the quality and blood of the sire than anything else, and I am glad to see that this fact is being realized more each year by the sheep owners of the State. Therefore, those who have a knowledge of the principles of breeding will find it profitable to themselves and a great benefit to the sheep industry of the State, to locate flocks of throughbreds in different sections, and devote their skill and knowledge to the maintenance and improvement of the requisite qualities of the breed or breeds which are best-suited to the requirements of each.

BREEDS OF SHEEP.

Having concluded that the growing of mutton as a primary object, and the production of the best quality of mutton as a special object, would yield the largest profit and the best results to a majority of those in the State who are engaged in the business of sheep husbandry, the next thing of importance to consider is the breeds and kinds of sheep best suited to the requirements.

The Common or Native Sheep:—While the so-called native sheep are of no particular breed, they must necessarily be considered as one of the important elements in the business, from the fact that the common ewes are usually easily and cheaply procured, or in other words, they are the available raw material with which, by the aid of the more expensive thoroughbreds, valuable flocks may be soon bred up.

Our native common sheep, evidently have descended through successive generations from the first sheep introduced into Virginia in 1609, and those brought over later from all countries. Large, middle and long wool types came from England; small, mountain varieties from the highlands of Wales, England and Scotland; merino types from Spain, and mixed breeds from all countries. The majority of these pioneer sheep were no doubt unimproved varieties in their native countries. After their arrival here, they were interbred, crossed, and the blood of all types intermingled, thus forming common hardy types differing from any of the original ones, yet peculiarly suited to the changed conditions.

When the importation of improved breeds began, early in the present century, a gradual improvement commenced and has been continued,

until at present, most of our common sheep show the effect of improvement in certain recognized lines. Thus the native common sheep of the northern portion of the State are mainly merino grades. Those in the central counties, and certain other sections, are principally Southdown and Cots: old grades. While in some of the mountain districts and southern counties unimproved descendants of the old pioneer stock predominate.

Like the native sheep of Great Britain and all other old countries, the native common sheep of West Virginia are usually adapted to the conditions under which they have been kept. They are the result of a mixture of different breeds, with no predominating or fixed characteristics to transmit to their offspring, aside from their hardy constitutions and adaptability to the sections in which they have been reared. Therefore, a cross with the pure bred ram, having certain desirable and fixed characteristics, shows a magical effect in the improvement of the first set of lambs, and if the use of thoroughbred sires is continued from generation to generation, the improvement will continue until the flock may be even better, for mutton and wool, than the pure breeds.

It was from my earliest experience in breeding sheep that I learned the value of the common ewe in breeding up a valuable sheep for mutton and wool, by the use of thoroughbred sires. I find from my records that the second cross of Southdown rams and common ewes, produced sheep that weighed from 180 to 200 pounds at maturity, and the weight of the fleece was increased, from three pounds to ten and twelve pounds.

Many of our sheep owners do not seem to appreciate the value of our common native ewes, and the possibilities and profits to be derived from their proper improvement. I know instances where they have been sold to the drover, and what seemed to be better sheep were purchased in the city market to take their place. It was afterwards found that the new sheep were, either not adapted to the changed condition, or they were the means of introducing certain contagious diseases, which proved to be a future curse to the sheep industry of the region in which they were introduced.

The Pure Bred Sheep:—The use of the pure bred sires is one of the first principles of success in any line of the sheep industry; therefore, every sheep owner should become familiar with certain facts regarding pure bred sheep. By the term pure bred or thoroughbred sheep, we mean those which have descended through successive generations (without admixture of impure blood or blood of different breeds) from a breed having a fixed type and desirable characteristics which are transmitted with reasonable certainty to their offspring. They may be divided into two classes, one as recorded, the other as unrecorded.

The recorded ones are those having their names or numbers, and their pedigrees recorded in a record book kept by an association of breeders. The rules of the several record associations require that no animal shall be admitted to record unless satisfactory evidence can be furnished that it has been purely and honestly bred. The recorded sire is therefore to be depended upon for purity of blood, and if due judgment is exercised in their selection, the best results should be gained from their use in breeding up the common stock.

The unrecorded sheep may be a pure bred animal, or may not. The pure breeds are those which have been carefully bred, and a private record kept of their breeding, but have not been presented for entry in the record book of the association. Others may be pure bred, but as there has been no record kept of their breeding, we can only depend on the statement of the breeder as evidence that they are.

In visiting or corresponding with breeders with a view of purchasing pure bred animals, it will be advisable for those who have not had experience to keep in mind the following suggestions:

In no case where it is possible to get breeding rams from reliable breeders should anything but pure bred ones be used.

It is the right of each breeder of thoroughbred sheep to think that his breed is the best, and it is his privilege to convince every other owner of sheep that he is right, if he can. Hence, the importance of becoming sufficiently informed regarding the characteristics of different breeds, that we may trust largely to our own judgment in making the selections.

No matter how long a pedigree a ram may have, or how many of his ancestors may have been recorded, he may be practically worthless on account of lack of individual characteristics, or from being overfed and pampered to make a premium show sheep. "Hot house rams" are often dear as a gift, to those who do not take extra care of their sheep.

As a rule, the best results will be gained by the average sheep owner from the use of breeding stock purchased from breeders who are careful to have high bred animals, but only give them ordinary feed and care. Such sheep may not look so well, but in most cases, they will be found to be worth four or five times more than those which have been fixed up for show and to attract the buyer.

Mutton Breeds of Sheep:—The several mutton breeds of sheep found on the British islands are of special interest to us, from the fact that we are indebted to them for the improvement we have been able to make in our flocks of mutton-sheep. The large number of breeds and varieties of sheep found on the comparatively small area of these islands is very remarkable, and a study of the causes which brought about and established such widely varying types is very instructive. We find the large, coarse Romney Marsh sheep thriving on the low, marshy lands "of the southern coast of Kent." We find the Cotswold, Lincoln, Leicester, Shropshire Down, Oxford Down, etc., on the best level and slightly rolling lands of England. The Hampshire Down, South Down, Dorset and Cheviot predominate on the hills and rough land. The Welsh mountain, the Scotch Black Face and many other highland and forest breeds are found admirably adapted to rocky highlands and heather pastures. In the north of Scotland, and on the Shetland and Orkney Islands, diminutive breeds are found "extremely hardy and capable of subsisting under great privations of food."

Thus, it will be seen that in each section where some peculiar conditions of soil, altitude, etc., predominate, one or more breeds of sheep are found with certain established characteristics specially suited to their environments.

"English and Scotch farmers and growers with an experience of cen-

turies oft repeated and dearly paid for, have found which class of sheep are best adapted to given sections of country, and they keep the sheep on the soil to which they are best fitted. Nature is no longer antagonized but instead, improvement follows where her footsteps lead, and sheep farming in Great Britain has been reduced to a science." In West Virginia, as in England and Scotland, we have widely varying conditions of valley, upland, mountain, forest, pastures, etc., each requiring different methods of breeding and rearing sheep for market. If we are to be guided by "the dearly paid for experience" of the British shepherds, we will not try to adapt the large valley breeds to poor, roughland pastures, but profit by their experience and select, as near as possible, that breed which it has been proven as especially adapted to the conditions and requirements in each case. We must remember that there is no single breed that will readily adapt itself to all conditions, and at the same time yield the best results, and that the different English mutton breeds, from which we select our breeding stock, have been bred up to their present standard of excellence for certain purposes and to suit certain conditions and requirements. Therefore, in the judicious selection of pure bred breeding stock with which to improve the native and purchased common sheep, it will be found advisable for each owner of sheep to study the peculiar condition of his farm, the demands of his most accessible markets, decide which line of sheep husbandry is best adapted to the conditions and requirements, gain some information regarding the characteristics of the different breeds of sheep, and then select, as near as possible, from that breed which is best suited to the farm and the methods to be followed.

WHY ARE THERE NOT MORE SHEEP KEPT IN WEST VIRGINIA.

The question may be asked if West Virginia is so well adapted to sheep husbandry, and there are such large profits realized in the business, why is it that we have so few sheep compared with the area of cultivated and grazing lands in the State? In reply I would say that the dog, the tariff discussion, unwise start in the business, improper management, and a failure to study and appreciate the possibilities the business offers, are the main and only causes I can see to prevent us from handling five millions of sheep instead of about five hundred thousand, as recorded by the last census.

The excuse of nine-tenths of the farmers for not keeping sheep, is a fear of the justly, but indiscreetly abused dog. It has been unfortunate, perhaps, for the advancement of sheep husbandry in this State, that the dog has been so generally discussed and abused by speakers and writers. We should quit saying so much about them and act on the principle that a good dog stays at home or with his master, that a bad dog will prowl around and get into mischief, and that a dead dog kills no sheep.

Another excuse for not keeping more sheep, is a fear that some change in the tariff laws will be ruinous or detrimental to the business. In my opinion, this tariff question, about which there have been continued discussions, is in reality to be compared with a molehill, which,

under the political microscope, is magnified into a mountain. We are told by Democrats that a tariff for protection is all wrong. We are told by Republicans that it is all right. Now, as it is impossible for any feature of the tariff to be all wrong, and at the same time all right, my advice to the West Virginia farmer is to keep all the sheep he can properly care for and take the chances. After all, *the tariff will not effect the price of choice mutton, and as it is proven that sheep will pay better than other stock if they had no wool, any change in the tariff should not be the least detrimental to the business.*

Another reason why there is not more sheep kept is the fact that in nearly every neighborhood at some time, some one or more farmers hearing of the large profit to be derived from sheep husbandry have rushed into the business and overstocked their farms, not having previous experience, they failed, and ever after condemned sheep as worthless stock; their experience preventing their neighbors from undertaking to keep sheep. If these same men had commenced with only a few, and increased their flocks as they learned the business, the opposite results would, in most cases, have been gained.

Therefore, before going into the business, it would be well for each farmer to consider the following rule: If you have never kept sheep and desire to do so, get five or ten ewes, and a good thoroughbred ram of some of the mutton breeds adapted to your farm, give them good attention and feed and increase or decrease as your experience and judgment dictates.

In conclusion, I will say that, in this address, I have endeavored to emphasize certain points relating to profitable sheep husbandry in West Virginia, which I believe to be of importance to our farmers and to the agricultural development of the State.

1st That the greater portion of West Virginia is better adapted for sheep, the dairy, and large fruits than to any other lines of agriculture.

2nd. That sheep are the best stock with which to improve exhausted and poor land, and that they will maintain and improve the fertility of new and well cared for lands.

3rd In proving from records of eighteen years that sheep paid better than any other product on two widely differing farms.

4th That generally speaking, the method most likely to yield the largest profits to flock owners, is the production of *first class market lambs and fat sheep* for home and eastern markets, as a primary object, leaving wool as a secondary one.

5th. That sheep husbandry in West Virginia offers inducements to intelligent men of energy and ambition, which should be seriously considered before they leave the farm for *more risky and less profitable pursuits in towns and cities, or in pioneer life in new countries.*

Notes of Travel in West Virginia and Europe.

EXTRACTS REFERRING TO SHEEP.

While traveling through a portion of Webster county in July, 1890. I inquired of a farmer why there were not more sheep kept in that county, as it seemed to be so well adapted to them. His reply was "sheep are about the only thing we can sell for cash, the consequence is when we get hard up, we sell our sheep and spend the money. That is one reason why there are not more sheep kept here."

During an investigation tour through Hardy, Hampshire, Grant and Pendleton counties in May, 1892, I found extensive forests of pine timber which had been killed by insects (the destructive pine bark beetle). While it is a fact that pine usually grows on thin land, it is as a rule a sandy well drained soil on which sheep do remarkably well. I found that most of the pine land in this region was well adapted to grass. If this land was cleared of the dead timber and sown to grass without previous cropping, then stocked with sheep and properly managed, the revenues derived from the sheep, would, in my opinion, more than recompense for the loss of the timber. In some of the valleys, near these pine covered hills and mountains, the land is extremely rich and adapted to the growing of an abundance of feed of all kinds, and where the sheep bred on the piney highlands could be fattened for market. In one of these rich valleys; the Moorefield valley in Hardy county, I visited an estate where three hundred and fifty tons of hay, five thousand bushels of oats, five thousand bushels of corn and two thousand bushels of wheat had been grown the previous season. The live stock at that time numbered 250 horses and 70 head of cattle. This estate of about 2,000 acres of valley land and some 8,000 acres of mountain lands, principally in timber, is owned by a young man from Brooklyn, New York, who had invested his inherited fortune in West Virginia ginia land.

The following extracts are from notes during an extended journey in June, 1892, up the Monongahela and Tygart's Valley rivers as far as Beverley in Randolph county; up the Dry Fork of Cheat river to its head, from the head of the Greenbrier river to its mouth, returning to Morgantown by the Chesapeake & Ohio, Ohio River and Baltimore & Ohio railroads:

At the hotel at Elkins, I met Mr. James Buriel, a Brooklyn New York butcher, who made the following statements in answer to my inquiries regarding the demand for mutton and sheep in the Brooklyn and New York markets.

"The working people as well as the wealthy people are buying more mutton every year; the latter paying high prices for a first class article. There will be a great demand for good mutton in our markets in the future. In the Brooklyn and New York markets, we do not want heavy sheep. We do not want them to dress over 50 to 75 pounds, and we want them blocky, meaty sheep with good backs and hams. We have millionaires for customers, and they prefer mutton from the medium sized sheep. The best mutton we get is from Canada. They are long-wooled

lambs delivered here in September. We call the round bodied, blocky darkfaced sheep we get from the States "butterballs," and we want all we can get of them. We do not like to handle merino sheep. Their mutton as a rule is inferior. The western sheep also make poor mutton. Buyers object to the fat in the large fat sheep weighing 200 pounds and over, and we have to cut it out and sell it for tallow. Therefore, we do not like to handle that kind of sheep."

Mr. Bruce of the firm of C & E Bruce, was also at the hotel above mentioned and made the following statements:

"I spent three years in Australia on a sheep run where 150,000 sheep were kept, and I have now been in West Virginia three years grazing sheep and cattle and trading in them, (buying and shipping to eastern markets), in Randolph, Nicholas, Webster, Roane, Braxton and Clay counties. My observations and experience are that if mutton sheep were properly handled in West Virginia they will pay 25 per cent. more on the investment than sheep do in Australia. My opinion is that West Virginia is better adapted to the growing of mutton sheep in connection with cattle than to any other farm product."

The firm mentioned above are owners of some of the best grazing land in the State, and are extensive breeders and dealers in sheep. Their property is located near the head of the Valley river in Randolph county. They had, at that time, 500 high grade Shropshire Oxford and Southdown breeding ewes.

At Hendricks in Tucker county, I was informed by Mr. M. F. Wiley, who is a buyer of sheep and cattle in Tucker, Randolph, Pendleton, Barbour and Grant counties, that although that section of the State was admirably adapted to sheep there were hundreds of farmers who did not keep them. In answer to the question—what does it cost to clear the ordinary mountain land and put it in shape for sheep? He said that it cost about \$1.25 an acre to "hack the timber." By "hacking" is meant to girdle the trees which are left to die, then the underbrush is cleaned out. He said that most of the mountain land adapted to grazing can be made ready for sheep for about \$3 to \$5 per acre and that sheep would run on these mountain pastures from the middle of April, to the middle of November without extra feed.

The mountain ranges in this State, unlike those in most countries, are not rocky and barren, but as a rule are fertile to the very summits, producing an abundance of wild forage plants in the forests, and the best of pasture grasses when cleared of the timber. In fact, I have seen on the very summit of the Allegheny mountains 4000 feet above the sea, some of as fine blue grass as ever grew, as will be seen by the following notes:

June 22nd, 1892. After ascending Dry Fork of Cheat on foot and horse back for about 30 miles from Hendricks, we spent a day and night at a logger's camp. The next morning I was furnished with a guide and we started out on horseback to explore the extensive forests of spruce. We first ascended East Rich mountain by a narrow, winding path, our horses having to frequently jump over logs lying across it. Near the summit, we came to some cleared grazing land, and while taking shelter from a thunder storm in the house of the owner of this

mountain farm, I obtained the following information from our host, Mr. S. K. Nelson, regarding the method of keeping sheep there.

"Sheep run in these mountains and do well. One man can care for one thousand five hundred sheep during the year. During the winter, they are kept principally on browse, especially when the ground is covered with snow. I can keep sheep on browse better than on hay. Sugar and beech are the best browse. We cut the trees all winter. One tree will usually be sufficient for ten sheep one day. I have kept sheep here five years, and I have never fed more than a sled load of hay and have given them no grain and they do well. I do not think one would lose over five per cent. of the sheep if properly managed, and one hundred ewes will raise nearly one hundred lambs. John Mulanax near here, kept about 800 ewes last winter."

After we left Mr. Nelson's, we traveled on some distance through a dense forest and came out into an open of several hundred acres in extent. Here the timber had been backed several years previous and left to die and decay. The ground was thickly covered with fallen and decaying trunks of trees, among which, large numbers of sheep and cattle were grazing on some of as fine blue grass as I ever saw.

I was informed that these cleared lands are owned by parties in Virginia and this State who drive their cattle and sheep into these mountain pastures and ranges and place them in charge of herders who look after them during the summer and winter.

After traveling through a number of these mountain pastures, we descend the mountain to another logger's camp where we got our dinners; after which we commence the ascent of the Allegheny mountains. We passed through the spruce forest for about six miles to the summit of the mountain where we emerge into and pass through a "burnt district" for about three miles. This "burnt district" is in Pendleton county. The timber was first killed by a fire in about 1862, and has frequently been burnt over since, until now there is about 5000 acres clear of logs and stumps. Part of this land is covered with a dense growth of the thornless blackberry (*Rubus Milsapughii*), and hundreds of acres of it is found on which nothing but a species of fern* grows, while other portions are covered with grass. Two hundred cattle were then ranging there, and it was estimated that 1000 sheep could be easily kept on it through the summer.

Adjoining this "burnt district" where the land had been enclosed and kept clear of briars and trash, there were hundreds of acres of blue grass sod, which would compare favorably with the average sods in the blue grass regions of Kentucky. A species of fragrant fern called "sweet ferren"† was found here, which is considered a valuable forage plant. It is quite common in rocky places in open fields and I was informed that it was sometimes cut and cured like hay to feed the sheep in winter.

From this interesting region, we returned along the summit of the Alleghenies through forests, burnings and hacking until we reached the Sinks on Gandy Creek. This is a noted grazing region, which

**Pteris aquilina*, L.

†*Aspidium fragrans*, (?) Swartz.

takes its name from numerous depressions in the limestone formations and from a natural tunnel, which extends for about three-quarters of a mile through a hill. Gandy Creek flows in and disappears at one end of this tunnel and rushes out at the other like a great spring.

All of the region lying on the head waters of Dry Fork and Laurel Fork of Cheat and the East Fork of the Greenbrier River including possibly 50,000 to 75,000 acres, is principally a limestone soil naturally adapted to blue grass. Here, we find large tracts of land which have been cleared and are being cleared by the hacking and burning methods. The grass comes up naturally as soon as the timber or underbrush is sufficiently removed to allow the sun to get to the ground. Some of the first land that was cleared in this way is now free from stumps and logs and we find here some elegant blue grass grazing farms.

As evidence of the grazing capacity of these lands, I will give a statement of Mr. Isaac Boggs, of Preston county, whom I met near the Sinks on his return from looking after his cattle in this region. He said that the cleared grazing land here will keep one two year old steer to every three acres. That he had kept one hundred head of cattle through the summer on 324 acres of which only 275 were cleared. Also that Col. McClure had fattened 125 three and four year old steers on 440 acres. He says that they drive the cattle in about the middle of April and remove them about the middle of October.

One tract of one thousand acres, that I examined personally, 600 acres of which had been cleared by the hacking method, was of special interest. Much of this so-called cleared land was covered with blackberry briars, fallen trunks of trees and stumps, yet there were 174 head of cattle, 30 sheep and 5 horses then on the place and all in excellent condition.

At present, this elegant grazing section is almost inaccessible. It is 25 miles from the nearest railroad, and we might say that far from roads of any kind, if they are all like the path by which we entered. However, this section is destined in the near future to be one of the best sheep grazing sections of the country, especially if the contemplated railroads are built through it. At present, there are not many sheep kept here on account of wild animals and dogs. While looking over the thousand acre range just mentioned, we found a dead sheep, which had been killed by a bear.

These grazing lands and ranges are nearly all at an elevation of between 3000 and 4000 feet. In the winter, the snow falls quite deep, but with a hardy breed of sheep and some artificial shelter, there would, in my opinion, be no more difficulty in keeping them through the winter here than in the extreme northern States and Canada.

From my observations, and what I can learn, there are hundreds of thousands of acres in the mountains and highlands of our State nearly or quite as good for sheep as the region I just mentioned. True, most of the land is at present covered with valuable forests of spruce and hard wood, but this timber is being rapidly removed by numerous lumber and timber companies who are specially interested in present gains from the manufacture and sale of lumber. No doubt many of these companies will be glad to dispose of their land at a reduced price

when the timber is all removed; therefore, there will be excellent opportunities offered to open up large sheep ranges.

In descending the valley of the Greenbrier river, I passed through what had been a great pine region between Traveler's Repose and Dunmore, in Pocahontas county. The land where the pine had stood is like all other pine land, not very fertile, but admirably adapted to a small, hardy breed of sheep.

Little Levels, in Pocahontas county, is a fertile limestone tableland at an elevation of about 2250 feet and is surrounded by mountains on which the land is rich and especially adapted to grass and sheep. The land of the levels is also very fertile, and admirably adapted to the breeding and feeding of large breeds of sheep.

The level limestone region near Lewisburg, Greenbrier county, was found to be a large area of some of the best grazing lands in the State, which is also especially adapted to large breeds of sheep, to the raising of market lambs, and to fattening sheep for market.

TRAVELS IN EUROPE.

August 24, 1892. As we passed through North Wales on the "Zulu" fast train for London on the Great Western Railroad, the Welsh hills on which the Welsh mountain sheep are grazed, were observed in the distance. I was impressed with the resemblance of this section of Wales to certain localities in West Virginia.

As we pass out of Wales and into Shropshire, England, large numbers of sheep were observed grazing on the best level land. This county, so far as I could judge from what I could see from my apartment window, is a rich, level country, devoted largely to grazing sheep and cattle. Although the land seemed to be as fertile as it is possible for land to be, field after field was observed covered with a thick coating of manure. Passing through Shropshire, Stafford and Warwick counties, we enter Oxford, the home of the Oxford Down sheep. Large numbers of what appeared to be this breed of sheep were observed grazing upon the extremely fertile and flat grass lands. So far as I could see, Oxford like Shropshire is a level and almost flat country unlike any section I have seen in West Virginia, but resembling very much certain sections of northern Ohio. From Oxford we passed through Berkshire, Buckingham and Middlesex to London.

After spending a day and night at London, I left there on the night train for Paris by the way of New Haven and Dieppe. To my regret and disappointment, we passed through the South Down hills, in Sussex, the home of the South Down sheep, after night.

In passing through France to Germany, I did not see a single sheep; in fact, it was not until I had spent several days in the valley of the Rhine and was traveling by rail from Strassburg to Dresden, Saxony by way of Frankfort-on-the-Main, that I observed the first flock of sheep. That there are plenty of sheep in these countries, I well knew. I judged, therefore, that the sheep must be either kept housed, or were on the highlands and not in the valleys through which I had been traveling. That mutton was a favorite meat on the continent was evident from its

being on one or more of the bills of fare each day at the hotels where I had been stopping. The excellent quality of this mutton and the large proportion of lean meat on the cutlets (about three times as much as on the average American cutlets) made me particularly anxious to see some of the sheep. The first flock of sheep was observed at the highest altitude on the railroad between Frankfort and Dresden in Gotha. There were about one hundred in the flock, which were in charge of a shepherd and his dog. They were small sheep with jet black faces and white legs. In general appearance resembling our unimproved native sheep.

I spent four days in the Kingdom of Saxony, but was not fortunate enough to be able to visit one of the many noted flocks of sheep there, and had to content myself with a look at some premium Saxony wool which was shown me by the Director of the Experiment Station at Meissen.

Returning to Strassburg through Bavaria, by the way of Munich, and through the Black Forest in Baden, by way of Constance and Tryberg, I saw large flocks of sheep on the highlands, near the head of the Danube river.

While in Switzerland, I had an opportunity of examining one of the Alpine sheep which graze with the goats on the almost vertical pasture lands in this beautiful Alpine country. This individual was a small, black, muscular sheep with fine wool, and admirably adapted to the mountain pastures.

September 25. Upon my return to England by the way of Berne, Laon, Calla and Dover, and entering the county of Kent, I saw more sheep from the train in five minutes in Kent than I had seen during my travels of nearly 2000 miles in France, Germany and Switzerland. The pasture fields in England seem to be literally covered with sheep, and I can now realize how there can be over one sheep to every acre of cleared and grazing land in England, and that in some counties there is an average of five sheep to the acre. (In West Virginia, we only have an average of one sheep to every seventeen acres of cleared land).

September 26. After I had secured my steamer ticket at London and had taken the train for Liverpool, it occurred to me that as my steamer did not sail until the afternoon of the 28th, it would be just as well to stop off somewhere between London and Liverpool, and see something of the country. Passing through Middlesex, Hartford, Bedford, Northampton and Leicester counties, and into Nottingham county, I stopped off at the city of Nottingham in the evening, trusting to chance to find something of interest in that region. After engaging a room at the George Hotel, I made inquiry about the points of interest, and if it would be possible for me to visit a sheep farm in that county. I was referred to the firm of Mills & Gibbs as parties who could give me information regarding the agriculture and sheep industry of that portion of England, and the next morning I called at the office of the firm to obtain the desired information. Mr. Mills, who was the owner of a large estate at Ruddington Hall, about five miles from the city, gave me a letter to his manager at Ruddington. I, therefore, drove out to this place and after taking lunch with Mr. Gibson, the manager, we start out through a

driving rain to look at the stock. The Shorthorn cattle were the first examined, and from the cattle, we visited the sheep.

The Shropshires are the favorite breed and are bred and fed to a very high state of perfection. Some individuals were shown me which has cost "sixty guineas" (about \$300). These sheep are kept on the best pasture and feed the farm can produce and receive a great amount of attention and care from a trained shepherd who is well up in the business. Therefore, every sheep is made to appear to the very best advantage. After examining a large flock of ewes which were being bred, we visited another pasture in which a flock of Dorsets ewes were found. These ewes were brought in Dorsetshire and bred to a Hampshire ram, so they would commence lambing in October to produce lambs for the Christmas market. Then they were to be bred again so as to produce another set of lambs in the spring, or early summer. From this field, we passed through large fields of mangolds, swedes, turnips, rape and cabbage which were being grown for the sheep. I was informed by Mr. Gibson that the sheep are first hurdled on the cabbage then on rape and flat topped turnips, followed by swedes, and that the mangolds are cut and fed to them in the winter. Farther on, a flock of great Lincolns were observed feeding on cabbage, a certain amount being apportioned to them each day by the use of hurdles.

Returning to the barn, we examined some mangolds which had been kept over from last year. They were found to be as sound as the day they were pulled. From here, we drove through beautiful fields surrounding the characteristic English country gentleman's home, Ruddington Hall, and I returned to Nottingham well pleased with what I had learned of the English methods of farm management and stock breeding.

Summary of Answers to Circular Letter.

For the purpose of gaining certain information regarding the sheep industry in different sections of the State, a list of questions were prepared and sent out in a circular letter to about 200 addresses selected from our mailing list. Reports were received from 46 counties, and from 127 correspondents who had some experience with sheep. Sixty-seven had experience with more than one breed. Twenty-eight had experience with one breed only, and thirty two had kept sheep, but had no experience with thoroughbreds.

The following table will show the number of votes each breed received for different purposes.

There were not a sufficient number of reports from any one county or section of the State to enable us to form any definite conclusions from the answers to the several questions; however the answers as here tabulated will serve to indicate the prevailing opinions on the subjects mentioned:

	Southdown.	Shropshire.	Cotswold	Merinos—Spanish, American, etc.	Belaine Merino.	Black Top Merino.	Oxford.	Hampshire.	Leicester.	Lancsh.	Saxony.	Native.	Lincoln Southdown Cross.	Merino Shropshire Cross.	Merino Southdown.	Dorset.
The number of votes for the Favorite ram to cross with common ewes to produce mutton sheep were.	61	26	11	4	2		1	1	1	1			1	1		
To produce market lambs	44	30	12				5	3	2	1			1	1	1	
To produce mutton and wool combined	24	27	19	11	5	1	7	1		4			1		2	
Number of flocks of thoroughbreds reported	23	37	7	19	10	4	9	2		1	3					1
Breeds which seem to be favorites in counties from which reports were received.	45	30	7	22	4	2	6		1			2	1			
Predominating blood in improved grades as reported.	39	11	12	20		1	2	1		1	1					

The price of recorded rams as reported from different sections range from \$5 to \$75 or an average of about \$25. The price for unrecorded rams as reported range from \$2.50 to \$35, or an average of about \$12.

The prevailing diseases, parasites, &c., as reported, were as follows, their prevalence being indicated in the order in which they are here given: Catarrh, including what is termed rot, foot rot, grub in the head, body scab, paper skin, swelled jaw, ticks, stretches, diarrhea, head scabs, liver fluke, lung worms, anemia, murren, fits, maggots in wool, pulling wool, "neglect" and "starvation."

Ninety-one correspondents reported that sheep were more profitable, than any other farm product. Three claimed the largest profit for

the dairy. One that cattle paid best, one that sheep and cattle combined were the most profitable, while thirteen did not answer.

It was my desire and intention to include in this bulletin descriptions and illustrations of the different breeds of sheep, with chapters on methods of management, feeding, treatment of diseases and other important subjects of interest to sheep owners. I have found, however to my regret, that owing to serious depredations of insects in our forests, and on certain farm crops, together with my absence of about six weeks in Europe, my time has been so completely occupied with duties pertaining to the Department of Entomology that I could not devote the time necessary to complete the bulletin as I had intended. In fact, there has been so much published on these questions of late in government reports, and in the many excellent agricultural and stock journals, that in order to issue a bulletin containing much new or original matter that would be of special value to those engaged in the industry in this State, it will be necessary to make further research, investigation and experiments. Especially is this important in ascertaining the best breeds of sheep for different sections; in investigating the causes of different diseases and experimenting with remedies and preventives, in experimenting in the breeding and feeding of sheep and lambs, in the growing of roots and forage crops and the investigation of many other important subjects pertaining directly to the needs and to the advancement of the sheep industry in West Virginia.

